

ASSOCIATION OF PLASMINOGEN ACTIVATOR INHIBITOR-1 GENE 4G/5G POLYMORPHISM IN ST ELEVATION ACUTE MYOCARDIAL INFARCTION IN YOUNG PATIENTS LESS THAN 45 YEARS

ABSTRACT

Introduction

Prevalence of Acute Myocardial Infarction (AMI) in younger age is increasing in the recent years worldwide and in India, it is 8-10 %. It has been reported that 60% young AMI is due to genetic causes. Recent studies showed that SNP in PAI-1 (4G/5G) play a major role in AMI and can be used for screening. There is a need to authenticate the effectiveness and sensitivity of SNP in PAI-1 (4G/5G) in India patients of age less than 45 years. This study focuses on detection of SNP in PAI-1 (4G/5G) by Polymerase Chain Reaction (PCR) and quantification of PAI-1 in plasma in young AMI patients. Additionally, this study aids in establishing the indicative evidence range of PAI-1 in plasma to AMI. Furthermore, this study helps in ascertaining SNP in PAI-1 (4G/5G) as a bio-chemical marker for young Indian AMI patients. The outcomes of this study will facilitate early diagnosis of AMI, an end stage diseases, and establishment of its treatment scheme.

Aims and Objective of the study

Aim of this study is to ascertain SNP in PAI-1 (4G/5G) as an independent bio-chemical marker for the Indian young AMI patient's age less than 45 years. The objectives of the study are : 1. Inquiring the independent association between STEMI and the 4G allele, 5G allele polymorphism,

2. Establishing the analytical range of PAI-1 in plasma to young AMI patients,
3. Correlating the association between plasma PAI-1 and 4G/5G polymorphism of young AMI patients,
4. Finding the association of plasma PAI-1 with other risk factors of AMI and
5. Checking the connection of CK-MB with PAI-1 and its 4G/5G gene polymorphism.

Methodology

This study conducted at Mahatma Gandhi Memorial hospital, Trichy, during May 2016 to March 2017. Study subjects includes 33 Patients aged less than 45 years with AMI who had typical chest pain, shows electrocardiographic changes (ST Elevation) and a transient rise in cardiac enzymes to more than twice the upper limit without any other risk factors like DM, HT, smoking, alcohol and equal number of age and sex matched control subjects. Plasma PAI-1(ELISA KIT-KOCH 3071) was assayed within six months of sample collection. ARMS- PCR was done with separated DNA. Remaining plasma was transferred to another eppendorf tube for the analysis of Blood Glucose, Urea, Creatinine, Total Cholesterol, Triacylglycerol, and HDL, Alanine transferase (ALT), Aspartate transferase (AST), Serum Electrolytes, Creatine Kinase-MB (CK-MB).

Result and statistics

Statistics was analyzed using SPSS software. The mean and SD of plasma PAI-1 for patients and Controls are 3450.76 ± 1406.68 and 1966.03 ± 1406.68 . There was a positive significance variation of plasma PAI-1 ($P \leq 0.001$) observed between patients and controls. Plasma PAI-1 level in individuals with 4G/5G polymorphism range from 3000-5000 pg/ml Plasma PAI-1 wherein the Normal Genotype is 1000-2000 pg/mg. Plasma PAI-1 shows significant changes

with 4G/5G SNPs($P \leq 0.001$). The mean and SD of Plasma PAI-1 of homozygous and heterozygous types were observed as 4307.88 ± 706.38 for the 4G/4G polymorphism, 3930.62 ± 542.57 for the 4G/5G polymorphism, 3600.71 ± 782.98 for the 5G/5G polymorphism, wherein, it is 1690.50 ± 799.99 for the normal genotype. Further, a positive significant changes between patients and controls in Serum Urea: $P \leq 0.001$, Serum Glucose: $P \leq 0.04$, Serum AST: $P \leq 0.001$, Serum HDL: $P \leq 0.008$, Serum CK-MB: $P \leq 0.001$, Plasma PAI-1: $P \leq 0.001$ were also observed.

Conclusion:

This study results concludes that the independent association between STEMI and the 4G allele, 5G allele polymorphism among South Indian euthenics. This study established an analytical range of PAI-1 in plasma (4G/4G, 4G/5G, and 5G/5G SNPs) to young Indian AMI patients as 3000-5000 pg/ml and for the Normal Genotype it is 1000-2000 pg/mg. The study showed a positive association between the 4G/5G polymorphism and Plasma PAI-1 antigen levels and AMI, also shows positive correlation with serum urea It also showed an inverse association of 4G/5G polymorphism and PAI-1 antigen levels with the HDL-cholesterol levels.

Key words: PAI-1 4G/5G SNP, SNP in PAI-1, Acute Myocardial Infarction,

SNP in young AMI, Genetic Biomarkers in AMI.